

WHAT IS CLAIMED IS:

- 1 1. A system comprising:
 - 2 an optical member positioned between an intended location of a
 - 3 viewer and an environment of interest to said viewer, wherein a visible light
 - 4 path from said viewer to objects in said environment has a substantially
 - 5 unitary magnification, at least a portion of said optical member being
 - 6 wavelength-selective with respect to reflectivity characteristics, such that said
 - 7 optical member is generally transmissive with respect to visible light and is
 - 8 substantially reflective with respect to a particular detection wavelength;
 - 9 a detector for receiving light of said detection wavelength
 - 10 reflected by said optical member from said viewer within said intended
 - 11 location, said detector having a detector output that is responsive to said
 - 12 received light; and
 - 13 a processor connected to said detector for processing said
 - 14 detector output, wherein optical properties along said visible light path from
 - 15 said viewer to said objects remain independent of said processing.
- 1 2. The system of claim 1 wherein said optical member is a dichroic mirror
- 2 along said at least a portion of said optical member.
- 1 3. The system of claim 1 wherein said detector and processor are configured
- 2 for detection of human eyes.
- 1 4. The system of claim 3 wherein said processor is further configured to
- 2 correlate detection of said human eyes to stored identifications of particular
- 3 persons, thereby enabling said system to specifically identify said human
- 4 eyes.

1 5. The system of claim 1 further comprising a first light source for emitting
2 first light having said detection wavelength, said first light source being
3 directed to reflect said first light from said optical member to an anticipated
4 position of eyes of said viewer within said intended location, said detector and
5 said processor being dedicated to acquiring data that is specific to said eyes.

1 6. The system of claim 5 wherein said processor is configured to monitor
2 perceived alertness of said viewer on a basis of said data.

1 7. The system of claim 6 wherein said optical member is a windshield of a
2 motor vehicle.

1 8. The system of claim 7 wherein only a portion of said windshield has a
2 coating which provides said wavelength selectivity, said coating defining a
3 dichroic mirror within said portion, said detector and said first light source
4 being positioned out of view with respect to vision of a driver of said motor
5 vehicle through said windshield.

1 9. The system of claim 5 wherein said processor is configured to provide
2 identification of said viewer, said processor having access to a database of
3 alternative viewer identifications.

1 10. The system of claim 9 wherein said optical member is a glass divider.

1 11. The system of claim 5 further comprising a second light source for
 2 emitting second light having said detection wavelength, said second light
 3 source being directed to reflect said second light from said optical member to
 4 said anticipated position of said eyes, but at an angle that is distinguishable
 5 from an angle of said first light

1 12. A system for eye detection comprising:
 2 a dichroic mirror which is generally transparent to visible light
 3 and which reflects light having a specific wavelength range;
 4 a first light source for emitting first light to impinge said dichroic
 5 mirror such that said first light is reflected at a first illumination angle;
 6 a second light source for emitting second light to impinge said
 7 dichroic mirror such that said second light is reflected at a second illumination
 8 angle greater than said first illumination angle, said first light and said second
 9 light having substantially equal intensity within said specific wavelength range;
 10 and
 11 a detector located for receiving back-reflected light from said
 12 dichroic mirror as a consequence of reflection of said first and second light
 13 toward said dichroic mirror from a subject's eyes;
 14 wherein said subject's eyes are detectable using the difference
 15 between back-reflected said first light and back-reflected said second light.

1 13. The system of claim 12 wherein said first and second light sources are
 2 sources of infrared (IR) light, said specific wavelength range reflected by said
 3 dichroic mirror including said IR light.

1 14. The system of claim 12 wherein said dichroic mirror is a divider between
 2 anticipated positions of said subject and a second person with whom said
 3 subject is interacting, said detector and said first and second light sources
 4 being located outside any line of sight from said subject to said divider.

1 15. The system of claim 12 wherein said dichroic mirror is a region of a
2 windshield of a motor vehicle, said detector and said first and second light
3 sources being embedded within a dashboard of said motor vehicle.

1 16. The system of claim 15 further comprising a processor for receiving data
2 from said detector, said processor being configured to monitor pre-identified
3 conditions indicative of drowsiness of a driver of said motor vehicle, said
4 driver being said subject.

1 17. The system of claim 12 wherein said dichroic mirror is a limited region of
2 a windshield of a motor vehicle, said detector and said first and second light
3 sources being outside any line of sight from a driver to said windshield.

1 18. A system for a motor vehicle comprising:
2 a windshield with at least a portion having a coating which
3 defines a dichroic mirror that is generally transparent to visible light and
4 substantially reflective with respect to a driver-detection wavelength range;
5 a detector for receiving reflected light within said driver-detection
6 wavelength range following reflection from said windshield; and
7 a processor connected to said detector for determining informa-
8 tion regarding a driver of said motor vehicle on a basis of said reflected light
9 received at said detector.

1 19. The system of claim 18 wherein said detector is positioned outside any
2 line of sight from said driver to said windshield.

1 20. The system of claim 19 wherein said detector is embedded in a
2 dashboard of said motor vehicle.

1 21. The system of claim 19 further comprising a first light source for emitting
2 first light within said driver-detection wavelength range toward said defined
3 dichroic mirror, said first light source being positioned such that said emitted
4 first light is reflected toward an anticipated location of the face of said driver.

1 22. The system of claim 21 further comprising a second light source for
2 emitting second light within said driver-detection wavelength range toward
3 said defined dichroic mirror so as to illuminate said face at an angle greater
4 than illumination by said first light, wherein pupils of said driver's eyes are
5 detectable using a difference between back-reflected said first light and
6 back-reflected said second light.

1 23. The system of claim 22 wherein said first and second light sources and
2 said detector are embedded in a dashboard of said motor vehicle.

1 24. The system of claim 23 wherein said first and second light sources are
2 IR emitters.

1 25. The system of claim 18 wherein said processor is configured to monitor
2 perceived conditions of drowsiness of said driver.

1 26. The system of claim 18 wherein said processor is configured to identify a
2 specific said driver.

1 27. A method for use in a motorized vehicle comprising:
2 providing a windshield that is generally transparent with respect
3 to visible light and provides reflection of first light within a driver-detection
4 range of wavelengths;
5 providing a detector in a position to receive reflected said first
6 light from said windshield without obstructing vision through said windshield;
7 and
8 determining information regarding a driver of said motor vehicle
9 on a basis of data acquired via said detector.

1 28. The method of claim 27 further comprising directing at least one beam of
2 said first light toward said windshield for reflection onto eyes of said driver,
3 each said beam originating from a source that is located so as not to obstruct
4 vision through said windshield.

1 29. The method of claim 28 wherein directing each said beam is implemented
2 by embedding each said source in a dashboard of said motor vehicle.

1 30. The method of claim 28 wherein directing each said beam includes using
2 an infrared light source.

1 31. The method of claim 27 wherein determining said information regarding
2 said driver includes monitoring drowsiness.

1 32. The method of claim 27 wherein determining said information includes
2 identifying said driver.